



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

CENTURY LABS II CORPORATION
 6004 Highview Drive, Suite F
 Fort Wayne, IN 46818
 Robin Bork Phone: 260 471 1673

CALIBRATION

Valid To: May 31, 2012

Certificate Number: 2417.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
pH – Measuring Equipment ³	(4, 7, 10) pH	0.025 pH	Certified pH solutions

II. Electrical – DC & Low Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage – Generate ³	(0 to 220) mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1100) V	30 μV/V + 0.80 μV 8.9 μV/V + 1.2 μV 9.2 μV/V + 4.0 μV 9.2 μV/V + 8.0 μV 9.4 μV/V + 0.10 mV 11 μV/V + 0.60 mV	5700A Fluke calibrator

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage – Measure ³	(10 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V	35 $\mu\text{V}/\text{V}$ + 3.0 μV 10 $\mu\text{V}/\text{V}$ + 0.30 μV 8.5 $\mu\text{V}/\text{V}$ + 0.50 μV 12 $\mu\text{V}/\text{V}$ + 30 μV	3458A option II DMM
	(100 to 1000) V	21 $\mu\text{V}/\text{V}$ + 0.10 mV + 12 $\mu\text{V}/\text{V}$ ($V_{\text{IN}}/1000$) ²	
DC High Volt	(1 to 2) kV (2 to 20) kV	0.040 % + 0.40 μV 0.080 % + 0.40 V	Vitretek 4600A
	(20 to 50) kV (50 to 100) kV	2.4 % 2.5 %	Hipotronics KV100 A
DC Current – Generate ³	(0 to 220) μA 220 μA to 2.2 mA (2.2 to 22) mA (22 to 220) mA	65 $\mu\text{A}/\text{A}$ + 10 nA 63 $\mu\text{A}/\text{A}$ + 10 nA 64 $\mu\text{A}/\text{A}$ + 0.10 μA 72 $\mu\text{A}/\text{A}$ + 1.0 μA	5700A calibrator Add $200 \cdot I^2$ $\mu\text{A}/\text{A}$ for $I > 100$ mA
	220 mA to 2.2 A	0.010 % + 30 μA	Add $10 \cdot I^2$ $\mu\text{A}/\text{A}$ for $I > 1$ A reference calibrator
	(2.2 to 11) A (11 to 20) A	0.06 % + 0.50 mA 0.06 % + 0.75 mA	Fluke 5520A calibrator
	(20 to 100) A	0.27 %	Guildline 9211A shunt
	(100 to 550) A (550 to 1000) A	0.28 % + 0.58 A 0.31 % + 0.58 A	Fluke 5500A coil
DC Current – Measure ³	(0 to 100) nA 100 nA to 1 μA (1 to 10) μA (10 to 100) μA 100 μA to 1 mA	0.018 % + 40 pA 35 $\mu\text{A}/\text{A}$ + 40 pA 67 $\mu\text{A}/\text{A}$ + 0.1 nA 29 $\mu\text{A}/\text{A}$ + 0.80 nA 39 $\mu\text{A}/\text{A}$ + 5.0 nA	3458A option II DMM

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage – Generate ³			
(0.22 to 2.2) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	0.38 % + 5.0 μV 0.23 % + 5.0 μV 0.21 % + 5.0 μV 0.31 % + 5.0 μV 0.40 % + 8.0 μV 1.3 % + 15 μV 3.2 % + 30 μV 14 % + 40 μV	5700A calibrator
(2.2 to 22) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	0.063 % + 6.0 μV 0.026 % + 6.0 μV 0.015 % + 6.0 μV 0.055 % + 6.0 μV 0.11 % + 8.0 μV 0.28 % + 15 μV 0.37 % + 30 μV 0.58 % + 40 μV	
(22 to 220) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	0.061 % + 16 μV 0.025 % + 10 μV 0.012 % + 10 μV 0.037 % + 10 μV 0.092 % + 30 μV 0.12 % + 30 μV 0.32 % + 40 μV 3.6 % + 0.10 mV	
(0.22 to 2.2) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	0.063 % + 0.10 mV 0.019 % + 30 μV 95 μV/V + 7.0 μV 0.015 % + 20 μV 0.031 % + 80 μV 0.052 % + 0.15 mV 0.13 % + 0.40 mV 0.24 % + 1.0 mV	
(2.2 to 22) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 to 1000) kHz	0.060 % + 1.0 mV 0.019 % + 0.30 mV 95 μV/V + 70 μV 0.016 % + 0.20 mV 0.032 % + 0.40 mV 0.064 % + 1.7 mV 0.18 % + 5.0 mV 0.33 % + 9.0 mV	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage – Generate ³ (cont)			
(22 to 220) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.060 % + 10 mV 0.019 % + 3.0 mV 0.010 % + 1.0 mV 0.027 % + 4.0 mV 0.066 % + 10 mV	5700A calibrator
(220 to 1100) V	50 Hz to 1 kHz	0.010 % + 4.0 mV	
AC Voltage – Measure ³			
(1 to 10) mV	(1 Hz to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.048 % + 3.0 μV 0.041 % + 1.1 μV 0.055 % + 1.1 μV 0.12 % + 1.1 μV 0.77 % + 1.1 μV 4.6 % + 2.0 μV	3458A option II DMM
(10 to 100) mV	(1 Hz to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	85 μV/V + 4.0 μV 86 μV/V + 2.0 μV 0.016 % + 2.0 μV 0.035 % + 2.0 μV 0.096 % + 2.0 μV 0.43 % + 10 μV	
(0.1 to 1) V	(1 Hz to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (0.3 to 1.0) MHz	0.013 % + 40 μV 0.012 % + 20 μV 0.024 % + 20 μV 0.044 % + 20 μV 0.12 % + 20 μV 0.48 % + 0.10 mV 1.7 % + 0.10 mV	
(1 to 10) V	(1 Hz to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (0.3 to 1.0) MHz	0.014 % + 0.40 mV 0.014 + 0.20 mV 0.022 % + 0.20 mV 0.048 % + 0.20 mV 0.12 % + 0.20 mV 0.48 % + 1.0 mV 1.7 % + 1.0 mV	
(10 to 100) V	(1 Hz to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.033 % + 4.0 mV 0.033 % + 2.0 mV 0.033 % + 2.0 mV 0.056 % + 2.0 mV 0.19 % + 2.0 mV 0.63 % + 10 mV	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage – Measure ³ (cont)			
(100 to 700) V	(1 Hz to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz	0.056 % + 40 mV 0.056 % + 20 mV 0.074 % + 20 mV 0.14 % + 20 mV	3458 option II DMM
(20 to 100) kV	50 Hz to 1 kHz	2.6 %	Hipotronics KV 100A
(0.0 to 2) kV	(20 to 100) Hz	0.070 % + 0.20 V	Vitretek 4600A
(0.0 to 2) kV	(100 to 400) Hz	0.40 % + 0.20 V	
(2 to 20) kV	(20 to 100) Hz	0.20 % + 2.0 V	
AC Current – Generate ³			
(9 to 220) µA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.081 % + 30 nA 0.043 % + 25 nA 0.019 % + 20 nA 0.10 % + 50 nA 0.20 % + 0.10 µA	5700A calibrator
220 µA to 2.2 mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.081 % + 50 nA 0.043 % + 40 nA 0.018 % + 40 nA 0.071 % + 0.50 µA 0.18 % + 1.0 µA	
(2.2 to 22) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.084 % + 0.50 µA 0.044 % + 0.40 µA 0.018 % + 0.40 µA 0.071 % + 5.0 µA 0.18 % + 10 µA	
(22 to 220) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.084 % + 5.0 µA 0.044 % + 4.0 µA 0.023 % + 4.0 µA 0.071 % + 50 µA 0.19 % + 0.10 mA	
220 mA to 2.2 A	(20 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.076 % + 40 µA 0.086 % + 0.10 mA 0.13 % + 0.20 mA	
(3 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.091 % + 2 mA 0.11 % + 2 mA 3 % + 2 mA	5520A calibrator

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current – Generate ³ (cont)			
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.15 % + 5 mA 0.18 % + 5 mA 3 % + 5 mA	5520A calibrator
(16.5 to 149) A (150 to 1025) A	(65 to 440) Hz (65 to 440) Hz	1.1 % + 0.25 A 1.1 % + 0.90 A	Fluke 5500A coil
AC Current – Measure ³			
(5 to 100) µA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.47 % + 30 nA 0.19 % + 30 nA 0.11 % + 30 nA 0.12 % + 30 nA	3458A option II DMM
100 µA to 1 mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.47 % + 0.20 µA 0.18 % + 0.20 µA 0.091 % + 0.20 µA 0.061 % + 0.20 µA 0.11 % + 0.20 µA 0.47 % + 0.40 µA 0.64 % + 1.5 µA	
(1 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.47 % + 2.0 µA 0.18 % + 2.0 µA 0.091 % + 2.0 µA 0.061 % + 2.0 µA 0.085 % + 2.0 µA 0.47 % + 4.0 µA 0.64 % + 1.5 µA	
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.47 % + 20 µA 0.18 % + 20 µA 0.091 % + 20 µA 0.061 % + 20 µA 0.090 % + 20 µA 0.68 % + 40 µA 0.64 % + 1.5 µA	
100 mA to 1 A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	0.48 % + 0.20 mA 0.22 % + 0.20 mA 0.15 % + 0.20 mA 0.17 % + 0.20 mA 0.37 % + 0.20 mA 1.2 % + 0.40 mA	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current – Measure ³ (cont)			
(1 to 20) A (1 to 20) A	10 Hz to 1 kHz (1 to 10) kHz	0.15 % 0.76 %	Valhalla 2575
(20 to 100) A (100 to 700) A 100 to 700) A	10 Hz to 1 kHz (48 to 62) Hz (62 to 440) Hz	0.15 % 3.5 % 5.8 %	Valhalla 2575 Fluke 80i-1010 current probe
Capacitance – Generate ³			
(0.19 to 0.4) nF (0.4 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz	0.52 % + 0.01 nF 0.52 % + 0.01 nF 0.52 % + 0.01 nF 0.27 % + 0.01 nF 0.27 % + 0.10 nF 0.27 % + 0.10 nF 0.27 % + 0.30 nF	5520A calibrator
330 nF to 1.1 µF (1.1 to 3.3) µF (3.3 to 11) µF (11 to 33) µF (33 to 110) µF (110 to 330) µF 330 µF to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	(10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz	0.27 % + 1.0 nF 0.27 % + 3.0 nF 0.27 % + 10 nF 0.42 % + 30 nF 0.47 % + 0.10 µF 0.47 % + 0.30 µF 0.47 % + 1.0 µF 0.47 % + 3.0 µF 0.47 % + 10 µF 0.77 % + 30 µF 1.2 % + 0.10 mF	
Capacitance – Measure ³			
Up to 1 pF	40 kHz 100 kHz	0.34 % + 1 fF + 6 cts 0.34 % + 1 fF + 3 cts	Agilent 4274A LCR meter cts: Counts of LSD
(1 to 10) pF	4 kHz 10 kHz 20 kHz 40 kHz 100 kHz	0.34 % + 6 cts 0.34 % + 3 cts 0.34 % + 2 cts 0.34 % + 1 fF + 6 cts 0.34 % + 1 fF + 3 cts	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Capacitance – Measure ³ (cont)	Fixed Points		
(10 to 100) pF	400 Hz	0.34 % + 6 cts	Agilent 4274A LCR meter cts: Counts of LSD
	1 kHz	0.34 % + 3 cts	
	2 kHz	0.34 % + 2 cts	
	4 kHz	0.34 % + 6 cts	
	10 kHz	0.34 % + 3 cts	
	20 kHz	0.34 % + 2 cts	
	40 kHz	0.34 % + 6 cts	
	100 kHz	0.34 % + 3 cts	
(100 to 1000) pF	100 Hz	0.34 % + 3 cts	
	120 Hz	0.34 % + 3 cts	
	200 Hz	0.34 % + 2 cts	
	400 Hz	0.34 % + 6 cts	
	1 kHz	0.34 % + 3 cts	
	2 kHz	0.34 % + 2 cts	
	4 kHz	0.34 % + 6 cts	
	10 kHz	0.34 % + 3 cts	
	20 kHz	0.34 % + 2 cts	
	40 kHz	0.34 % + 6 cts	
(1 to 10) nF	100 Hz	0.34 % + 3 cts	
	120 Hz	0.34 % + 3 cts	
	200 Hz	0.34 % + 2 cts	
	400 Hz	0.34 % + 6 cts	
	1 kHz	0.34 % + 3 cts	
	2 kHz	0.34 % + 2 cts	
	4 kHz	0.34 % + 6 cts	
	10 kHz	0.34 % + 3 cts	
	20 kHz	0.34 % + 2 cts	
	40 kHz	0.34 % + 6 cts	
(10 to 100) nF	100 Hz	0.34 % + 3 cts	
	120 Hz	0.34 % + 3 cts	
	200 Hz	0.34 % + 2 cts	
	400 Hz	0.34 % + 6 cts	
	1 kHz	0.34 % + 3 cts	
	2 kHz	0.34 % + 2 cts	
	4 kHz	0.34 % + 1 cts	
	10 kHz	0.34 % + 1 cts	
	20 kHz	0.34 % + 1 cts	
	40 kHz	0.34 % + 1 cts	
100 kHz	0.34 % + 1 cts		

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments	
Capacitance – Measure ³ (cont)				
(100 to 1000) nF	100 Hz	0.34 % + 3 cts	Agilent 4274A LCR meter cts: Counts of LSD	
	120 Hz	0.34 % + 3 cts		
	200 Hz	0.34 % + 2 cts		
	400 Hz	0.34 % + 6 cts		
	1 kHz	0.34 % + 3 cts		
	2 kHz	0.34 % + 2 cts		
	4 kHz	0.34 % + 1 cts		
	10 kHz	0.34 % + 1 cts		
	20 kHz	0.34 % + 1 cts		
	40 kHz	0.34 % + 1 cts		
	100 kHz	0.34 % + 1 cts		
	(1 to 10) μF	100 Hz		0.34 % + 3 cts
		120 Hz		0.34 % + 3 cts
200 Hz		0.34 % + 2 cts		
400 Hz		0.34 % + 1 cts		
1 kHz		0.34 % + 1 cts		
2 kHz		0.34 % + 1 cts		
4 kHz		0.34 % + 1 cts		
10 kHz		0.34 % + 1 cts		
20 kHz		0.34 % + 1 cts		
40 kHz		3.0 % + 1 cts		
100 kHz		3.0 % + 1 cts		
(10 to 100) μF		100 Hz	0.34 % + 1 cts	
		120 Hz	0.34 % + 1 cts	
	200 Hz	0.34 % + 1 cts		
	400 Hz	0.34 % + 1 cts		
	1 kHz	0.34 % + 1 cts		
	2 kHz	0.34 % + 1 cts		
	4 kHz	1.0 % + 1 cts		
	10 kHz	1.0 % + 1 cts		
	20 kHz	3.0 % + 1 cts		
	(100 to 1000) μF	100 Hz	0.34 % + 1 cts	
120 Hz		0.34 % + 1 cts		
200 Hz		0.34 % + 1 cts		
400 Hz		1.0 % + 1 cts		
1 kHz		1.0 % + 1 cts		
2 kHz		1.0 % + 1 cts		
4 kHz		3.0 % + 1 cts		
10 kHz		3.0 % + 1 cts		
20 kHz		3.0 % + 1 cts		

Parameter/Equipment	Frequency	CMC ^{2,4} (±)	Comments
Capacitance – Measure ³ (cont)			
(1 to 10) mF	100 Hz 120 Hz 200 Hz 400 Hz 1 kHz 2 kHz	1.0 % + 1 cts 1.0 % + 1 cts 1.0 % + 1 cts 3.0 % + 1 cts 3.0 % + 1 cts 3.0 % + 1 cts	
(10 to 100) mF	100 Hz 120 Hz 200 Hz 400 Hz 1 kHz 2 kHz	3.0 % + 1 cts 3.0 % + 1 cts 3.0 % + 1 cts 5.0 % + 1 cts 10 % + 1 cts 10 % + 1 cts	
(100 to 1000) mF	100 Hz 120 Hz 200 Hz	10 % + 1 cts 10 % + 1 cts 10 % + 1 cts	
Inductance – Generate ³			
1 H 10 mH	(0.1 to 1) kHz (0.1 to 1) kHz	0.12 % 0.12 %	Standard inductors
200 μH	10 Hz to 1 kHz	0.29 %	
Inductance – Measure ³	Fixed Points		
Up to 100 nH	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz 10 kHz 20 kHz 40 kHz 100 kHz	1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts	Agilent 4274A LCR meter cts: Counts of LSD

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Inductance – Measure ³ (cont)	(100 to 1000) nH	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz 10 kHz 20 kHz 40 kHz 100 kHz	Multi-frequency LCR meter, cts: Counts of LSD
		1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 0.58 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 1.2 % + 0.1 nH + 5 cts 0.35 % + 0.1 nH + 3 cts	
	(1 to 10) µH	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz 10 kHz 20 kHz 40 kHz 100 kHz	
(10 to 100) µH	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz 10 kHz 20 kHz 40 kHz 100 kHz	0.58 % + 0.1 nH + 5 cts 0.58 % + 0.1 nH + 5 cts 0.58 % + 0.1 nH + 5 cts 0.35 % + 3 cts 0.35 % + 3 cts 0.35 % + 3 cts 0.12 % + 3 cts 0.12 % + 3 cts 0.12 % + 3 cts 0.23 % + 3 cts	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Inductance – Measure ³ (cont)			
(0.1 to 1) mH	(100, 120) Hz	0.35 % + 3 cts	Multi-frequency LCR meter, cts: Counts of LSD
	200 Hz	0.35 % + 3 cts	
	400 Hz	0.35 % + 3 cts	
	1 kHz	0.12 % + 3 cts	
	2 kHz	0.12 % + 3 cts	
	4 kHz	0.12 % + 3 cts	
	10 kHz	0.23 % + 3 cts	
	20 kHz	0.23 % + 3 cts	
	40 kHz	0.23 % + 3 cts	
	100 kHz	0.12 % + 1 cts	
(1 to 10) mH	(100, 120) Hz	0.12 % + 3 cts	
	200 Hz	0.12 % + 3 cts	
	400 Hz	0.12 % + 3 cts	
	1 kHz	0.23 % + 3 cts	
	2 kHz	0.23 % + 3 cts	
	4 kHz	0.23 % + 3 cts	
	10 kHz	0.12 % + 1 cts	
	20 kHz	0.12 % + 1 cts	
	40 kHz	0.12 % + 1 cts	
	100 kHz	0.12 % + 1 cts	
(10 to 100) mH	(100, 120) Hz	0.23 % + 1 cts	
	200 Hz	0.23 % + 1 cts	
	400 Hz	0.23 % + 1 cts	
	1 kHz	0.12 % + 1 cts	
	2 kHz	0.12 % + 1 cts	
	4 kHz	0.12 % + 1 cts	
	10 kHz	0.12 % + 1 cts	
	20 kHz	0.12 % + 1 cts	
	40 kHz	0.12 % + 1 cts	
	100 kHz	0.12 % + 1 cts	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Inductance – Measure ³ (cont)	100 mH to 1 H	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz 10 kHz 20 kHz 40 kHz 100 kHz	Multi-frequency LCR meter, cts: Counts of LSD
	(1 to 10) H	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz 10 kHz 20 kHz 40 kHz	
	(10 to 100) H	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz	
	1000 H	(100, 120) Hz 200 Hz 400 Hz 1 kHz 2 kHz 4 kHz	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Dissipation Factor – Measure (Df) ³			
1 pF to 100 µF	(0.0001 to 10) Df	3.5 % + 1 cts	Multi-frequency LCR meter cts: Counts of LSD

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Calibration of Thermocouple Indicating Systems ³ – Simulation			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.56 °C 0.46 °C 0.41 °C 0.45 °C	5520A calibrator
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.41 °C 0.38 °C 0.43 °C 0.59 °C 0.98 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.59 °C 0.22 °C 0.20 °C 0.22 °C 0.27 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.33 °C 0.22 °C 0.20 °C 0.23 °C 0.29 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.40 °C 0.24 °C 0.22 °C 0.32 °C 0.48 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.52 °C 0.28 °C 0.25 °C 0.24 °C 0.39 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments	
Electrical Calibration of Thermocouple Indicating Systems ³ – Simulation (cont)				
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.67 °C 0.42 °C 0.40 °C 0.47 °C	5520A calibrator	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.56 °C 0.43 °C 0.44 °C 0.54 °C		
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.74 °C 0.30 °C 0.22 °C 0.20 °C		
Type U	(-200 to 0) °C (0 to 600) °C	0.65 °C 0.33 °C		
Electrical Calibration of RTD Indicators ³ – Simulation				
Pt 385, 100 Ω	(-200 to 100) °C (100 to 630) °C (630 to 800) °C	0.09 °C 0.15 °C 0.27 °C		5520A Calibrator
Pt 3926, 100 Ω	(-200 to 0) °C (0 to 300) °C (300 to 630) °C	0.08 °C 0.12 °C 0.15 °C		
Pt 3916, 100 Ω	(-190 to 0.0) °C (0.0 to 260) °C (260 to 600) °C (600 to 630) °C	0.07 °C 0.09 °C 0.12 °C 0.26 °C		
Pt 385, 200 Ω	(-200 to 260) °C (260 to 400) °C (400 to 630) °C	0.07 °C 0.15 °C 0.19 °C		

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Calibration of RTD Indicators ³ – Simulation (cont)			
Pt 385, 500 Ω	(-200 to 260) °C (260 to 600) °C (600 to 630) °C	0.08 °C 0.11 °C 0.13 °C	5520A calibrator
Pt 385, 1000 Ω	(-200 to 100) °C (100 to 600) °C (600 to 630) °C	0.06 °C 0.08 °C 0.27 °C	
PtNi 385, 120 Ω	(-80 to 100) °C (100 to 260) °C	0.10 °C 0.16 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.35 °C	
Oscilloscopes ³ –			
Rise Time 50 Ω load (< 2 MHz)	≤ 300 ps	(+ 0 ps / -100 ps)	5520A SC1100 calibrator
DC Voltage 1 M Ω Load 50 Ω Load	(0 to 130) V	0.058 % + 40 μV 0.29 % + 40 μV	
Square Wave 1 M Ω Load up to 1 kHz >1 kHz 50 Ω Load	(0 to 6.6) V 1 mV to 130 V _{pk-pk} 1 mV to 130 V _{pk-pk} 1 mV to 6.6 V _{pk-pk}	 0.12 % + 40 μV 0.29 % + 40 μV 0.29 % + 40 μV	
Flatness relative to 50 kHz	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (0.6 to 1.1) GHz	1.7 % + 0.10 mV 2.3 % + 0.10 mV 4.6 % + 0.10 mV 5.7 % + 0.10 mV	
Timing	5 s to 50 μs	(25 + t *1000) μs/s	
	20 μs to 100 ns	2.9 μs/s	
	50 ns to 20 ns	2.9 μs/s	
	10 ns 5 ns to 1 ns	2.9 μs/s 2.9 μs/s	
			t is time mark interval in seconds

III. Mechanical

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Vacuum and Pressure – Nitrogen ³	(-25 to 100) psi (100 to 300) psi (300 to 1999) psi	0.06 % FS 0.40 % FS 0.50 % FS	Fluke 718 Calibrator Transmation SS2110G Transmation SS1511G
Manometer Pressure ³	(0 to 20) inches H ₂ O (0 to 200) inches H ₂ O	0.10 % FS + 1 cts 0.10 % FS + 1 cts	MeriCal DP200C manometer
Absolute ³	(0 to 900) mmHg	0.03 % FS	Miriam 350 Absolute manometer
Hydraulic	(500 to 7000) psi (0.0 to 10 000) psi	0.06 % FS + 0.06 psi 0.30 % FS	Ashcroft 7000 and Omegadyne DP4 transducers
Vibration General Purpose	(5 to 9) Hz (10 to 99) Hz (100 to 1999) Hz (2 to 10) kHz	2.3 % 1.7 % 1.2 % 2.9 %	MB dynamic shaker

IV. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Infrared ³	(100 to 350) °C (350 to 700) °C (700 to 1000) °C	1.5 °C 10 °C 13 °C	Black bodies: Micron 305 and 310
Relative Humidity – Measure ³	(0 to 90) % RH	2.3 % RH	Vaisala HMI 31
Temperature – Measuring Equipment ³	Ambient to 600 °C	0.90 °C	Dry wells

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Temperature – Measure ³	(-196 to 300) °C (300 to 420) °C	0.020 °C 0.030 °C	Hart Scientific 5615-12 PRT

V. Time & Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
Frequency – Measuring Equipment	10 MHz	1 part in 10 ¹¹	Agilent 58503A GPS receiver
	10 Hz to 1.1 GHz	3 µHz/Hz	5520A calibrator, SC1100
Frequency – Measure ³	20 Hz to 200 MHz (200 to 1300) MHz	1 part in 10 ⁸ 1 part in 10 ⁵	Frequency counter and differential meter using 10 MHz distributed signal

¹ This laboratory offers commercial and field calibration services.

² Calibration and Measurement Capability (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. Calibration and Measurement Capabilities represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.



World Class Accreditation

The American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

CENTURY LABS II CORP

Fort Wayne, IN

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 11th day of April 2011.





Peter Meyer

President & CEO
For the Accreditation Council
Certificate Number 2417.01
Valid to May 31, 2012

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.